Industrial Finishing

An Independent Publication Devoted To The Finishing of Industrial Products

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With the Editor

WITH the smart array of 1927 models released during midsummer by the majority of automobile manufacturers, we are moved to further contemplation of what is admittedly one of the most stimulating and dominating forces in the industrial, commercial, financial and social activity of the world today.

The automotive industry has greatly accelerated development in mechanical, electrical, chemical and efficiency engineering. It is a leader in the expenditure of energy, brains and money for doing things in a bigger and better way; it is producing more and better motor cars, doing this in the finest type of industrial buildings equipped with highly developed, labor saving machinery and using the highest grade materials—therefore doing it economically. Every year sees added improvements in the engineering features, comfort, convenience, design and finishes incorporated in automobiles.

Modern finishes indeed play an important part in beautifying and preserving all exposed parts of the motor car. The automotive industry is setting a pace in the use of rapid-drying finishes of enduring character and attractive colors. New finishing materials, supplies and equipment have been developed to meet its especially rigid requirements for lasting quality, volume output, speed of production and economy of ultimate manufacturing cost.

Materials, equipment and methods identical and similar in character to what are used in the automotive industry, are available for and adaptable to manufacturing in many other lines, and it is up to other manufacturers to take advantage of this progress and adopt improvements—or to eventually lose out altogether.

W. H. Rohr

Managing Editor

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Of vital interest to every user of spray equipment —proper ventilation.

Proper Ventilation at Sprayers

The problem of removing spray fumes satisfactorily calls for the design and installation of ventilating equipment which operates efficiently, economically and safely to suit specific conditions

By C. G. Tredier

WITH the rapid growth and popularity of finishing by the spray method, history will doubtless repeat itself while the industry is in its infancy. Naturally there will be many confusing suggestions offered for the removal of fumes and correct ventilation in spray rooms and booths. It is certainly advisable for factories and individuals using spraying equipment, to carefully investigate the different methods and applications that are being offered to the industry.

As young as the industry is, there has already been spent many thousands of dollars for the installation of ventilating and exhaust systems that are not only worthless but dangerous and hazardous. The mere assembling of a hood and a makeshift fan does not assure satisfactory results. The biggest mistake seems to be one of offering the same size exhaust fan for different classes of work. There is a wide variation in the idea of proper or correct handling of fumes, and some glaring examples of poor judgment are to be found.

Varied Requirements

It may seem unnecessary to mention that some fumes and vapors are heavier and more pungent than others, while some spraying or methods of application are more voluminous in still other cases, because of the necessity of handling big work. Naturally it follows that the exhaust systems should be governed accordingly and that a "toy outfit" is utterly useless and an absolute waste of money.

It should not be necessary for the readers of this magazine to be forewarned on the question of looking to the manufacturers of well-known ventilating fans and blowers, for reliable information. They are experts in their line and through many years of experience have accumulated information and practical knowledge of how and what to install in the way of equipment.

The problem is not a difficult one nor does it require any mysterious application. There are certain common sense fundamentals that need be followed out and then, by dealing with responsible manufacturers, correct and proper methods of ventilating and exhausting fumes are obtainable at a nominal cost.

Below are enumerated several important points to bear in mind when purchasing ventilating or exhaust apparatus. They are explained in the following paragraphs somewhat in the order of their importance.

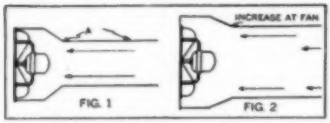
First: Systems involving air traps, etc., should be avoided for the reason that they are not only

hard to clean out, but are dangerous in case of fire, as it makes the extinguishing of the flame difficult.

Move More Air

Second: A large volume of air exhausted is highly desirable. In other words, the more rapid the air is changed, the greater will be the dilution of the fumes, hence the danger of explosion is greatly reduced and the minimizing of accumulation is accomplished. For instance, if about 500 cubic feet of vapor is formed a minute and 2000 cubic feet of air is exhausted per minute, you would dilute the vapors three to one, which means the possibility of explosion is entirely avoided.

The mixture would be so weak that setting it off into flame would be impossible—much the same as



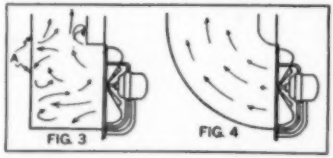
Plan views showing incorrect (Fig. 1) and correct (Fig. 2) designs of discharge piping leading from spray booth to an exhaust fan which is placed in opening of exit.

a poor and lean mixture of gasoline in an automobile engine. The above figures are offered for illustration only and not as a table to follow in handling a problem. Manufacturers of ventilating fans will offer the proper suggestions.

Avoid Belt Drives

Third: Fans operated by belts and pulleys should never be used for various reasons. One objection is that the belts and pulleys create considerable static which is a dangerous fire hazard. Another important reason from the mechanical standpoint, is that the belted outfit requires considerably more power to operate per cubic foot of air than a direct connected fan or blower.

In addition to this the air that is being exhausted—ladened with vapor fumes—is drawn directly over the bearings and into them, which causes rapid wearing out. Furthermore, belted outfits in order to handle the proper amount



Side elevations showing incorrect (Fig. 3) and correct (Fig. 4) shapes for discharge piping that elbows upward from spray booth fan. Note how fan in Fig 3 works against strong back pressure thereby causing eddying of air and a definite choking inside area marked "A".

of air (since more power is required per cubic foot) are often run at a higher speed in order to make up the deficiency. By so doing, a very rigid construction is required to overcome vibration and ultimate breaking down.

Use Closed Motors

Fourth: Open motor, direct connected exhaust fans should not be used in any case, as the accumulation of vapor or fumes in the motor winding will cause a burn-out in a short time, and of course in the case of single phase, alternating or direct current open motors, great danger would be encountered from a fire standpoint.

Fifth: Fully enclosed, direct-connected, motor-driven exhaust fans are obtainable with a self-cooled motor feature. These will not only be safe from the standpoint of fire hazard, but they are very economical to operate on account of their low pow-

er consumption. Wherever possible, two or three-phase alternating current should be used for operating propeller exhaust fans, as the self-cooled motor type is furnished with a squirrel cage, induction type of motor which is spark proof. That is, there are no brushes or commutators to cause sparking, consequently it has already been proved by various insurance underwriters as a desirable outfit to use.

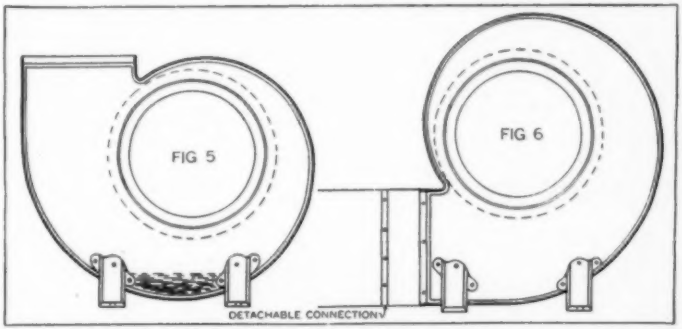
Size of Ducts Important

Sixth: A propeller exhaust fan should never be used when it is necessary to discharge air through a duct over 30 feet in length; in the latter instance, that is where the duct is not beyond this limit, it should not be less than the diameter of the fan, and preferably three to four inches larger. For instance, if a 24 inch fan is used the duct should be at least 27 to 28 inches in diameter, see Figs. 1 and 2. Sharp corners and bends should also be avoided, see Figs. 3 and 4. Where it is necessary to use duct work in excess of 30 feet, exhaust blowers are recommended.

Suitable Exhaust Blowers

Seventh: If exhaust blowers are to be used on account of the necessity of duct work, then it is extremely important that the blower with the proper discharge arrangement be used. In Fig. 5 is shown a side, cross section view of a blower with a top, vertical discharge arrangement. A blower set in this position will fill up at the bottom of the housing with the result that the wheel will strike this accumulation and jam up, hence the possibility of wrecking itself. In Fig. 6 is shown a blower with a bottom, horizontal discharge which is easy to get at for cleaning purposes through the use of a clean-out door or detachable connection at the discharge end.

Eighth: Exhaust fans and blowers should be cleaned regularly for several important reasons some of which are as follows: If an accumulation is allowed to gather on the wheels of the fan or blower, it increases the amount of power necessary to run this wheel at the required speed, due to the added weight. Secondly,



Accumulations of waste material almost impossible to see or to reach, occur in the bottom of the housing of a vertical discharge blower fan placed as shown in Fig. 5, whereas a fan mounted as illustrated in Fig. 6 discharges more naturally, more easily and more completely. By detaching the discharge pipe at connection shown in Fig. 6 the lower inside of housing is completely accessible for inspection and cleaning.

it interferes with the efficiency of the fan or blower by causing restrictions on the surface area of the blades. Thirdly, the longer the accumulation is allowed to gather, the more difficult it will be to clean, and finally, the greater the accumulation is, the harder it will be to extinguish any flame in case of fire.

Authoritative Information

From the foregoing hints and suggestions, it is no doubt obvious to the reader that the problem of correct ventilation in handling vapors and fumes is not difficult, but only a matter of common sense application, yet the industry is already threatened with the invasion of irresponsible manufacturers who have not, through the lack of experience, accumulated the knowledge that is already possessed by several reputable concerns who have given this subject long and extensive study in connection with their engineering research work and experience in the manufacture and installation of ventilating equipment.

Little difficulty should be encountered in procuring the right kind of apparatus if the various suggestions outlined are borne in mind. It was only after a careful investigation on this subject, that the information submitted herewith was compiled.

Touching Up Bare Spots In Lacquer

Even with the greatest of care a workman is apt to cut through on edges, corners and any raised spots, when rubbing, but such places may be so neatly remedied that they will not be noticed when the job is done. First of all, wash the part perfectly clean of any oil or wax, after which large spots may be covered by spraying, and smaller areas by means of a brush, or pencil.

The coating used to produce the regular finish may be used for the touching-up job, only it must be thinned somewhat. If the sprayer has been used in touching up, you had better do the whole panel over. After the touched-up parts are dry,—several hours will be necessary for this—they are to be rubbed and finished to match the remainder of the body.

Where the damage has come from shipment or from use of the automobile, it is easier to rectify where the finish is lacquer, than where varnish has been the coating. Where the finish on a body is with the usual paint coating, lacquer finish should not be employed.

If possible touch up with the same lacquer as that which was used when the automobile was finished. This, in order to get the same color. Otherwise you shall have to match the color the best you can. As hardly any two automobiles present the same problem in this touching-up work, each car will have to be considered as a special job and treated accordingly. Sometimes it is advisable to do a whole panel over rather than try to make a perfect finish with the touch-up color, or materials.—A. A. K.

Acid or acid fumes will cause rust and the free acid set loose when steel is pickled is an active agent.

New Finishes Announced

S. C. Johnson & Son announces a new No. 127 Oil Lacquer—a "new speed finish"—also a new Wax Drawer Coater.

Chicago Furniture Show Finishes

Interesting notes about various attractive woods and finishes incorporated in the latest furniture exhibited at the Chicago Furniture Mart in July

By R. G. Meade

IN VIEWING the July exhibit at the Chicago Furniture Mart it is inevitable that comparisons with past visits should come to mind. Two or three years ago the pale yellowish gray and amber of French Walnut met the eye on every side; a year ago it was the slightly deeper tones of Huguenot Walnut. This year the swing back is completed and we see walnut generally quite dark and shaded in many cases to almost a blackish brown. Two toning and vein lining seem to have lost their vogue almost entirely.

Woods and Coloring

In woods, walnut is still king but where once it stood alone or at most combined with gum it is now elaborated with overlays and insets of maple, mahogany, California redwood burl, satinwood, cedar, ash and stippled paint. Colonial, still true to mahogany and maple, birdseye and curly, is seen alone more than ever before. Even in walnut the variety of veneer cuttings is greater than ever; straight grain, butt, burl, quarter sawed, beeswing rotary cut and pencil stripe often appear on the same piece.

All these varieties present problems in finishing which call out the greatest skill and balance of coloring. With as many as six different woods appearing in an area often less than two feet square, a harmonious blend is not the easiest thing in the world to achieve. Not only must there be a careful mixing of anilines to adjust the natural coloring of so many varying veneers, but the shading and highlighting demanded on everything large and small requires the most delicate possible handling of the spray gun.

Design and Materials

In point of style, Spanish Renaissance undoubtedly affords the chief innovation of the season, with Oriental decoration second. The remainder of the exhibits show no inspiration traceable to any particular period though for some time Elizabethan, at least in the modified melon bulb leg turning, has enjoyed distinct favor.

Barrel or rounded fronts are in increasing evidence on dressers and consoles; rounded corners appear on buffets and servers. Spanish influence may be recognized in diamond shaped overlays and insets, arcaded underframing, scroll and twisted iron stretchers, medallions, Moorish hinges and locks, and rectangular cabinet work.

Finish materials employed to secure the effects referred to show no radical departures. Water stains predominate over oil stains, and filler is a necessity owing to the lack of open pored finishes such as were popular for Italian Renaissance. The shaded and high-lighted effects which ap-

pear on practically every piece in the building are ordinarily accomplished with water stain on the bare wood, but occasionally lacquer stains are used over the filler. This makes it possible to prepare suites for stock in straight color up to filler; then, if a shaded effect in the same style is desired, the lacquer stain is sprayed on around the edges of panels and overlays.

As far as it is possible to judge, lacquer and varnish divide the honors about equally in the natural wood top finishes, just as do lacquer enamel and oil enamel in the painted field. There are few concerns left who have not had enough experience with both to align themselves solidly either for one or the other.

In passing it may be said that the lacquer and lacquer enamel finishes at this show appeared to have greater luster and depth of film than ever before, a tribute no doubt, to advanced methods of manufacture. This fact would seem to remove what hitherto has been their weakest point of comparison with varnish and oil enamel.

Dining Room; Bed Room

In connection with the above general impressions it may be well to note them more specifically as applied to particular groups. Considerable Spanish influence is noted in the dining room suites, manifesting itself in very deep brown coloring with scroll overlays on fronts and wooden scroll stretchers or arcaded underframing, all high-lighted and shaded. The stretchers may also be of twisted iron painted red and green, or black and gold, antique glazed. Where brass hinges are used they are pierced through frequently showing a vermillion background.

In designs not of Spanish origin there is extensive use of redwood burls finished natural, and birdseye maple shaded in light and dark tones of warm reddish brown. China cabinets are frequent in Chinese red lacquer with typical flat or raised Oriental decoration in black and gold, the underframing in walnut to match the remainder of the suite. Table tops show separate oval shading for the two sections of the top instead of as a single unit, or at random as heretofore.

In the bedroom group a number of rounded designs were noted in light brown shaded birdseye maple with green vein lines, floral decorated maple overlays and light green vein lines with gum frames. Attention was also attracted to a similar design in reddish brown mahogany with a sunburst effect in striped wood at the tops, shaded butt walnut fronts, satinwood or cedar top drawer fronts, small redwood burl and large shaded curly maple overlays. The finish coloring was deftly harmonized.

A straight walnut Spanish suite with unfilled shaded ash panels and fiddle back mahogany overlays showed a novel imitation marquetry decoration obtained by sand blasting on the barewood over a stencil, then staining.

Enamel bedroom suites favored apple green, one straight color with gold vein lines; another shaded brown and floral decorated. A similar suite in deeper green had parchment front overlays and brown vein lines. Still another in lighter green had shaded maple overlays, obtainable also in shaded parchment with

the same overlays. Less combinations of green and lavender, ivory and brown shading, and black and gold were noted than in the past.

Breakfast Room and Reed

Chinese red and green, with black or brown shading, continue popular with some improvement in delicacy over former methods of high-lighting. Maple and light walnut with green banding were effective, decorated and frequently shaded. Silver gray and oak in general have rather lost their hold on breakfast room patterns. Reed furniture is executed in softer shades with more banding and repeat color insets than frosting. One suite, in what might be called a burnt wood effect, was parchment with dark brown shading at joints which gave it much the appearance of bamboo.

Novelty and Upholstered

Smokers, humidors and the like showed strong Chinese influence in red, green, yellow and black with hand painted, flat and raised oriental decoration. Noted too was a telephone set in shaded light green, floral decorated, and with vermillion cabinet interior; Spanish design cedar chests in dark walnut with polychrome medallions and heraldic insets and dull gold hinges; also red crackle over green with broad black striping between narrow lines of gold bronze; many decorated overlays; secretary desks in red and green with oriental raised decoration and Queen Anne underframing; gray book troughs shaded light green; an octagonal table in plain walnut with scarlet enamel shading and striping of black and gold.

Upholstered furniture featured increased use of painted over natural finish frames. One frame was green lacquer enamel with gold lined flutings and a side table to match. Another was in yellow with green lined fluting, lightly shaded and with end tables to match. Red leather upholstery with black and gold frame, and vermillion figured-silk with ebony black and silver frame showed Spanish and Chinese influences respectively.

Young Firm Grows

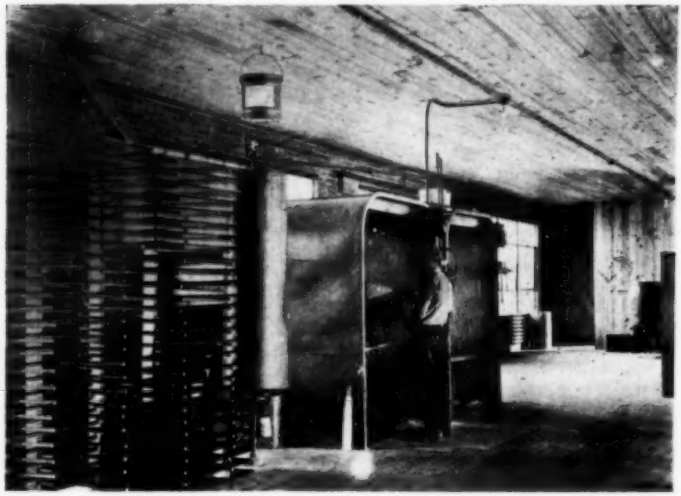
Owing to a steady increase in sales of the automobile and furniture lacquers and paints of the Wm. Lilly Paint Co., Indianapolis, Ind., the concern has been obliged to operate full force for the past several months and to install additional equipment. Plans for plant expansion in the immediate future are under consideration. The present officers of the company are William Lilly, president; Fred G. A. N. Nolting, secretary and sales manager; and A. W. Moodey, factory manager.

Mayer & Loewenstein Move Office to Factory

One of the oldest established varnish and enamel manufacturers, Mayer & Loewenstein, announces the change in address, after Labor Day, of their executive office, from 164 Water Street, New York City, to their new office building located at the factory in Long Island City, New York.

Due to constantly increasing business, and the desire to render the best possible service to the trade, the manufacturers of Clover Leaf Brand finishes have built another addition to their factory, which is located at 43-43 Vernon Boulevard, Long Island City, and in conjunction therewith, have arranged to use part of this building for their offices and general executive headquarters.

The first offices of Mayer & Loewenstein were established 81 years ago, and at that time, were located in Philadelphia. They then moved to New York, and had offices for many years at 80 Beekman St. For the past 40 years, the main office has been at 164 Water St., but with the growth of the city, and the accessibility of Long Island City, the Company has decided that it would increase efficiency of operation to have the office located at the factory.



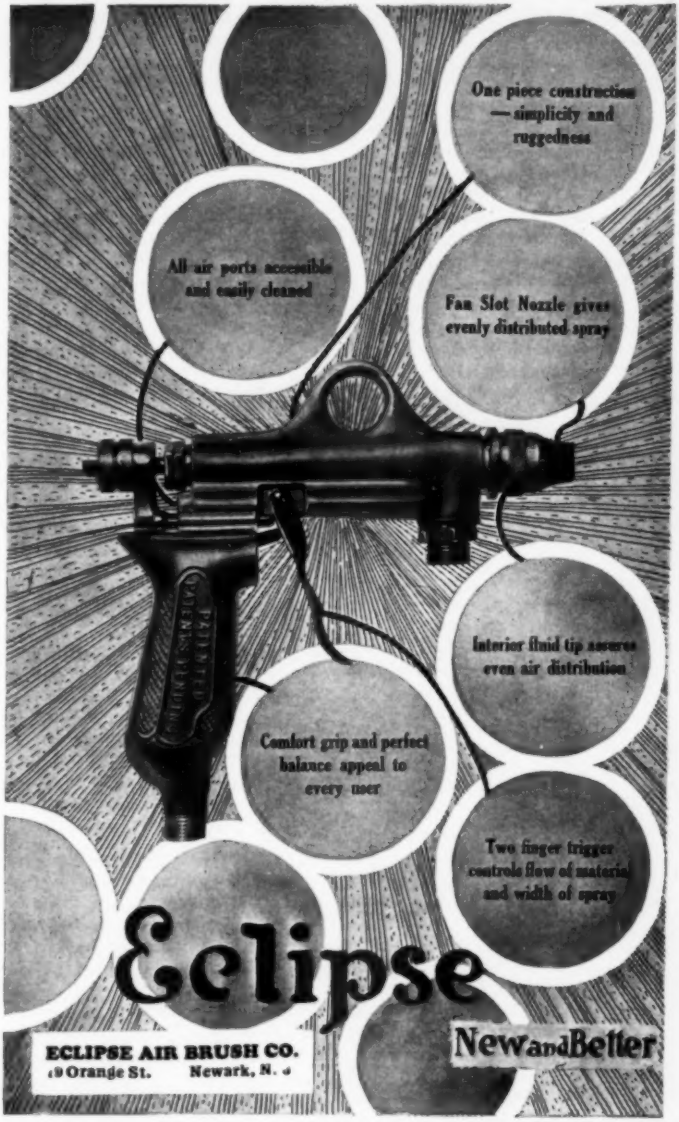
Finishing Room Cleanliness

Finishing Foreman of Hoosier Desk Co. calls attention to the advantages of finishing room cleanliness and tells how to maintain such conditions in a practical way.

By John H. Steffen

IT is important that the finishing department be kept as clean as possible at all times. Cleanliness means a saving of time and money in that it is conductive to a clean smooth finish; it saves time in the sanding and rubbing departments, and it also leaves a good impression upon anyone visiting or passing through the place. Work coming from the cabinet room should be well dusted before it is sent to the finishing department, as this will eliminate an enormous amount of dust which otherwise would be carried through the entire finishing department, causing a great deal of extra work and trouble.

In the staining room all benches and trestles or tables should be kept clean, especially after staining a lot of mahogany, for if this stain gets onto walnut or wood other than mahogany, a great deal of trouble, delay and extra work will be involved in getting it off again. When changing from one staining color to another it is best to see that all the stain from the last job is cleaned off all work benches, and the stain and brushes put away before starting a new job of a different stain color.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79 Orange St. Newark, N. J.

In the Filler Room

The filler room should be cleaned twice a day, the floor being swept at noon and evening, and all rags, sea-moss, and waste filler removed. Once each week the floor of the filler room should be scraped free of excess filler and dirt, which so often hardens and forms rough, lumpy accumulations. If this is done, the work can be moved about better and, in the case of furniture, where the legs of the articles to be filled are of frail construction, there will be fewer if any damaged pieces returned to the cabinet room with broken-off legs.

The Sanding Room

In the sanding room there should be a place for each of the different grades of sandpaper used and a barrel or large box in which to throw all the used sandpaper, thereby keeping it from being scattered about the floor. It is a good plan to oil the floor of the sanding room occasionally, as this prevents the dust from circulating, and the work is easier to move about, also.

Spray Booths

The spray booth and all spray equipment ought to be kept as clean as possible at all times, the booth being cleaned at least once a week. If it is allowed to go too long without cleaning, the fans get heavy, causing the motor to pull a heavier load; the blower pipes become clogged, causing a great deal of spray dust to stay in the booth, thereby hindering the operator and causing a dusty appearing finish. Old sandpaper from the drum sander, or a heavy packing paper can be used for lining the spray booth. Being temporarily fastened to the sides and floor, this material can be easily and quickly taken down at the end of the week and new paper put on. The top and upper sides of the booth can be greased with hard oil; also the blower pipes.

Spray Equipment

All hose and spray guns should be thoroughly cleaned, the hose to be cleaned at the end of a day's work, and the guns put in a solvent according to the material used. It is important that spray guns be given a good cleaning and oiling before they are used the next day. A tub of lye water should be kept in some convenient place, and all cups to draw shellac, varnish or other materials should be placed in the lye tub as often as necessary so as to keep them clean at all times.

The exhaust fans must be given particular care; if they are not kept clean they will soon wear out the motors and will also "eat up" power. The fans can be placed in lye water at the end of the week's work and taken out Monday morning, washed off with clear water and wiped dry with a rag. If the lye water is of the proper strength they will be thoroughly cleaned and no scraping will be necessary. The filter on the sprayer should be taken apart and cleaned and new waste placed inside at least once a month.

Recommended Practices

It is always best for the finishing room to be partitioned off and as near dust-proof as possible; also for all work to be cleaned and air-blown outside of the finishing room and then run inside. When any work is dusted or air-blown in the finishing room, this causes dust to circulate throughout the entire room, settling on the finished work before it has set. It is a good plan to oil the

What we can do for You
What can we do for you to help you in the development and management of new finishes in your finishing room? Our method of shading with Brown Lacquer Glazing makes the antiquing of furniture perfectly easy, and gives you that evenness of tone so sought after. This method followed with Gravarco 1009 Clear Lacquer and Gravarco 1022 Flat Lacquer produces the most durable and economical finish that is possible in the modern practice of lacquer methods.
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Grand Rapids, Michigan
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floor of the finishing room two or three times each year, and to clean the ceiling, walls and windows as often as possible, to keep them free of dirt and dust. The floor should be swept at least every other morning.

A piece of used paper from the disc sander can be placed at each drum of material, and the filling cup placed on it; this will keep all material off the floor and the paper can be changed as often as necessary. Time spent in keeping the finishing department clean is never a loss, but always a gain.

Rubbing and Polishing Lacquer Enamels

It is said there are experts at work to produce methods of rubbing and polishing lacquer enamels by mechanical means, this having reference to automobile bodies, which are now rubbed by hand in the old way, as we did carriage bodies years ago. We are indeed assured that portable machines will soon be on the market, and that they will do this work more rapidly and perfectly than can be done in the old way. There will be both rubbing and polishing devices, which may use any of the well known abrasives.

Sandpaper makers supply a liquid to be used in connection with their waterproof sandpaper, which is claimed to have a better action on the lacquer than water, and which is more effective with the sand paper than water alone.

Of lacquer polishing substances, a number are in use. These are commercial preparations, of course. Some contain fine abrasive powders which act in the usual manner of such compounds—that is by gentle abrasion—while certain others have wax as the principal agent, and which of course deposit a wax which forms the polish, instead of the lacquer. The first of these two preparations will give the more durable polish. The other gives a polish with the least effort.

Typical installation of small portable table rubbing machine operated by compressed air. The air passes through a separator or filter (shown in window), which cleans it of water, oil and sediment before it enters the machine. A larger and heavier portable rubbing machine, operated electrically, appears on window stool at extreme right.

Cheesecloth and canton flannel are used in connection with the lacquer polishes. These cloths should be clean and soft. Rubbing blocks are apt to cut through in certain raised places and on edges, hence the rubbing should be in straight lines and not by circular motion. Rub in the direction of the body, and do the hood to conform to this same direction.—A. A. K.

Lacquer production this year will run over 20,000,000 gallons.

The most expensive automobile lacquers have been sold in much the greatest volume.

Vitraloid Wood Lacquer No. 2546

THE use of this cellulose lacquer by furniture manufacturers assures satisfactory results in securing any wood finishing effect.

Can Be Used Directly Over Stain or Filler

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What paint method is most desirable from an automobile production standpoint.

'Cellulose Finishes on Autos

Excerpts from a paper presented at the 6th Convention of the Automobile Body Builders Association, at Detroit, by Chief Chemist of General Motors Research Laboratories

By H. C. Mougey

ON the first experimental cars finished with cellulose-nitrate materials, the color and rubbing varnishes were replaced with cellulose-nitrate materials and the luster was obtained by applying a coat of finishing varnish. However, it was found that the cellulose-nitrate coats could be polished to a high luster and since their durability was many times greater than that of finishing varnish, one large automobile company started in production in June, 1923, using cellulose-nitrate coats over the surfacer coats, obtaining the desired luster by rubbing and polishing the cellulose-nitrate coats.

Secret of Durability

This new finish satisfied many of the requirements of the ideal material. By simply walking down the street and examining the cars parked at the curb some of these cars, finished with this cellulose-nitrate finish in 1923, can be seen and the remarkable durability noted. However, this material is not absolutely unaffected by weather. Finishes exposed out of doors are not as durable as those exposed indoors.

The secret of the durability of cellulose-nitrate finishes on automobiles is due to the fact that although the automobiles themselves are exposed to the sun and the weather, the finish on the automobiles is protected by the particles of pigment which shield it from the sun. They may be considered as holding little umbrellas over the finish.

On the extreme surface there is a thin layer that has less protection and on exposure it gradually fails, and the particles of pigment on the extreme surface are no longer bound together as firmly by the cellulose-nitrate binder. In addition road dust, particles of oil vapor from other autos, etc., cause a deposit on the surface, but by the occasional use of a good polish the luster of a cellulose-nitrate finish on an automobile can be kept as good, or in some cases, even better than it was on the showroom floor.

The manufacturers of varnishes know about this increase in durability produced by protecting the binder in the film with particles of pigment, and many attempts have been made to get a finish more durable than finishing varnish, by putting pigment in the top coat. A remarkable durability can be obtained in this manner. House paint, bridge paint, etc., are examples.

However, if enough pigment is used to make a real increase in durability, the little particles of pigment break up the light so that a poor luster results, and it has not been possible to produce

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TO ESTABLISH THE VALUE of this finish for your line we shall gladly finish samples for you at Waukegan or make a complete demonstration at your plant.

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a film which is hard enough to polish without using oil-and-gum combinations that are too low in durability to rival the cellulose-nitrate finishes.

Complete Nitro-Cellulose Systems

I have shown how the color, rubbing and finishing varnishes have been replaced with cellulose-nitrate materials, still using primers and surfacers of the same type as the ones which were originally developed for the old-varnish finishes. The use of primer and surfacer coats of the varnish type was made necessary by the fact that the cellulose-nitrate material would not adhere to smooth metal.

In an attempt to decrease the time required for drying varnish primers and surfacers, several companies have tried to introduce cellulose-nitrate primers and surfacers. For a long time these attempts were unsuccessful, as the cellulose-nitrate primers and surfacers were poor in adhesion and gave finishes low in durability. However, these attempts were continued, and for the last year or so several automobile companies, making high-grade cars, have used certain cellulose-nitrate primers and surfacers in production, with success.

Refrigerator Test

It is a comparatively easy matter to produce cellulose-nitrate primers and surfacers that appear to be satisfactory when they are first applied, if they are tested in warm weather, but the real test comes after these materials have had time to thoroughly dry and harden and when they are tested for adhesion in cold weather.

I would recommend that any automobile company considering the use of cellulose-nitrate primers and surfacers, test these materials against primers and surfacers of the varnish type by drying thoroughly the finished car or test panel for three hours at 190-degs. F. or the proper time at lower temperatures, and then testing for adhesion in a cold room or refrigerator at a temperature as low as the car will encounter in service. In this climate the testing temperature should be below zero Fahrenheit. Since the adhesion rapidly improves with increase in temperature, the test should be made while the panel or car is cold.

Oil-Base Primers and Surfacers Improved

While the improvements in cellulose-nitrate primers and surfacers have been taking place, the manufacturers of varnish primers and surfacers have not been idle. They have developed varnish primers and surfacers for cellulose-nitrate finishes, drying in as short a time as two hours at 180-degs. F. At present the battle between cellulose-nitrate and varnish primers and surfacers is active, and it would require the ability of a high-grade prophet to predict the future in this respect.

In the case of fenders finished in colors other than black, it appears to be desirable from a production standpoint to apply cellulose-nitrate finishes over the black enamel applied in the usual manner. Unfortunately cellulose-nitrate finishes do not adhere to a smooth black-enamel surface any better than to smooth metal. By rubbing the black enamel there is obtained a surface to which cellulose-nitrate will adhere, but the rubbing must be thorough.

If a spot is missed or rubbed through, peeling may occur at

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This long experience has established a clientele among many well-known industrial concerns.

A recent inquiry to this publication disclosed the fact that our finishing products are used on the leading cars in the medium priced field.

Merit cannot long remain hidden. The facts will out. If you haven't heard much as yet, let us provide the evidence first-hand. May we?

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this point. For this reason, where there are enough parts to be finished to justify the expense, it is safer to use a primer that will give good adhesion without such thorough rubbing.

In some cars the cellulose-nitrate finishes are applied directly over the surfacer coats, and on other cars an intermediate coat of japan color is given. Both systems have their advantages, the point to be watched being that the japan color is of the right kind, if it is used. Some japan colors cause the cellulose-nitrate finishes applied over them to become brittle on exposure, and anyone planning to use cellulose-nitrate materials over japan colors should thoroughly test, by exposure, the particular combination under consideration.

Nitro-Cellulose Striping

In connection with the finishing of automobile bodies, the problem of striping must be considered. On the first cars finished with cellulose-nitrate materials, the striping was done in the ordinary manner using japan color and giving a protecting coat of finishing varnish over the stripe.

Improvements were then made using more elastic striping materials, but the maximum durability is not obtained unless the striping material be made from cellulose-nitrate materials. Even in this case there should be a large amount of material in the stripe so that it will resist abrasion and any tendency to rub through in service.

With the advent of several colors and tones and bands and stripes, as on some of the more recent cars, this problem of striping becomes more acute. Brushing lacquers are being tested for this purpose, but sometimes the results are not entirely satisfactory. For some of the broader bands and stripes the use of the regular material, applied with a smaller spray gun, seems to be one of the best solutions, but this problem can not be considered as satisfactorily solved at present.

Exposed Wood Surfaces

Another problem is the finishing of wood on exposed surfaces. Frequently, the modern automobile has little wood on exposed surfaces, but interior trim on closed cars, wooden parts on light delivery bodies, wooden spokes in artillery wheels, etc., make it necessary to give some attention to this problem. The difficulty appears to be due to the fact that when wood gets wet it swells.

When varnish finishes absorb moisture they swell with the wood, but cellulose-nitrate materials do not absorb enough water to make them swell as much as wood. When wood, finished with cellulose-nitrate finishes, absorbs water it swells and in some cases it bursts the finish. Great progress is being made in work on this problem, but before cellulose-nitrate finishes are used on wood for outside exposure, careful tests should be made to determine the suitability of the materials and the system.

Polishing Still a Problem

It has been shown how cellulose-nitrate materials have replaced color and rubbing and finishing varnishes, with the primers, surfacers, and ground color coats sometimes being replaced and in other cases holding their own against cellulose-nitrate materials.

The greatest problem at present is the rubbing and polishing of the cellulose-nitrate finishes,

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We shall be glad to answer any inquiry as to the correct reducers to use with lacquers,—colored or clear.

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This problem is so large that all the others fade into insignificance when compared with it. There are many factors affecting this problem. One of the greatest is the smoothness of the surface on which the cellulose-nitrate finish is applied. A little extra time spent on getting the surfacer smooth, saves considerable time in the final rubbing and polishing.

Other factors are the kind and amount of thinner, the flowing, rubbing and polishing properties of the lacquer, the spray guns and their use, the rubbing materials and systems, etc. At some plants the surface is polished directly or after rubbing, and at other plants a coat of thinner is applied after rubbing and before polishing to heal the scratches produced by rubbing.

The entire problem of rubbing and polishing is receiving a large amount of attention and since, at most plants, the rubbing and polishing is responsible for over half the total cost of labor, and a large part of the total time, the importance of this problem can hardly be over-estimated.

The new developments in materials and methods of automobile finishing have been brought about by the demand of the public for cars having more durable finishes. The results that have been obtained have come through the co-operation of the manufacturers of the finishing materials and of the car-building companies. I believe that through a continuation of this work, further improvements in durability and in the quality of the finish will be made, and that the time and labor required to produce the finish will be decreased.

An inherited trait of mankind is a love for color and design.

Locomotives in Attractive Colors

According to a recent newspaper dispatch the Southern Railway System has adopted a color scheme of green, gold and burnished steel for 23 heavy Pacific type passenger engines, now being received from the Richmond plant of the American Locomotive Co.

These engines, which will be used to pull the Southern's crack trains, have tenders, cabs, smokestacks and other projections above the boiler jackets, drivers and other wheels painted a rich dark green with goldleaf striping. The boiler jackets, driving rods and other running parts are highly polished. Four of them, to run between Washington and Atlanta, have their tenders lettered, "Crescent Limited," and three, to run between Chattanooga and Meridian, "Queen and Crescent Limited."

A respirator is a cheap and handy article—a life saver to many spray operators.

Quincy Compressor Activities

The latest news from the Quincy Compressor Co., of Quincy, Ill., is to the effect that the concern is preparing bulletins on paint spraying equipment, and that several new and larger models of compressors will soon be added to the present line. Plans are under way to obtain direct factory representation in many large industrial centers throughout the United States.

S. C. Johnson & Son Expand

During the past month S. C. Johnson & Son, Racine, Wis., completed the past year's building program, bringing the floor space up to 250,000 sq. ft. Along with its large laboratory, this concern now has one of the most modern enamel, varnish and lacquer manufacturing plants in the country. The increasing demand for Johnson's Industrial finishes has prompted the company to make plans for further expansion.

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Primers for Wood and Metal

The material that first goes onto the wood or metal surface is really the foundation of the finishing or painting job, and it must be designed to suit the surface over which it is spread

By E. Perry

IT IS a well known fact that changes in the moisture content of wood that has been kiln dried, will cause shrinkage or swelling (added moisture causing swelling) and that changes in the temperature of metals—especially sheet metals—causes contraction or expansion (added heat causing expansion).

The natural content of water in pine and other soft woods is about 12 percent, therefore if part of this moisture is driven off by kiln drying, or if the wood takes up an excess of water during wet weather, the wood will eventually expand in the case of kiln-dried lumber, or shrink when an excess of moisture is present or when green lumber is used. The shrinking and swelling of window sash and doors is thus accounted for, the wood eventually returning to its original condition with approximately 12 percent of water.

Stone, brick and cement expand and contract by heat and cold, and although they take up as much or more moisture than wood and paper, etc., (due to their porous and absorbent structure) the moisture has very little effect on them in the way of expansion or contraction.

Leather, cloth and paper are subject to expansion and contraction the same way as other materials, but in this case it is influenced by moisture and temperature.

The metals, although having no natural moisture content, expand and shrink in a similar manner, but expansion and contraction in this case, are caused by heat and cold.

In addition to this peculiar phenomena of expansion and contraction, another important point has to be considered—that of surface conditions. Whereas soft and brash woods with a porous structure and absorbent surface will take up a large amount of oil, hard or close-grained woods will take up less, and metal with a non-absorbent surface will practically take up merely a trace or no oil at all. Steel and iron are microscopically porous; lead, tin and copper are less so; zinc and aluminum are considered absolutely nonporous.

Stone, brick and cement are the most porous of all the building materials, consequently are great absorbents of oil and paint. Rough plaster is generally classed with cement as to surface absorption, and "hard finish" the same as stone.

The porosity and absorbent nature of leather, paper and cloth depend upon their surface finish and, as a rule, the closer the grain the less the absorption of oil and paint.

Soft Wood Primers

Most authorities agree that for soft woods with maximum absorbent surface, raw linseed oil is the proper vehicle; and for pigment, white lead alone or white lead and zinc oxide—the

A Flat Wood Lacquer that proves its own case

Our Flat Wood Lacquer No. 602-B will do more than any other lacquer of a similar nature—it ranks second to none.

It provides fast production at a very low cost because it eliminates rubbing.

It gives a tough, mar-resisting surface.

It will not crack, check, peel or shrink; there is no lacquer test it will not stand.

If you have any product which can be better, yet more inexpensively finished with a flat lacquer, you owe it to yourself to test No. 602-B. The proof of the pudding is in the eating.

Send for free sample

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latter to not exceed 40 percent—give best results.

A combination paint consisting of 60 percent of white lead, 30 percent of zinc oxide, and 10 percent of silica has proven to be an excellent primer; and where a thick film is desired and a cheaper primer is wanted, the composition may be modified to be 60 percent of white lead, 25 percent of zinc oxide, and 15 percent of whiting.

Yellow ochre, China clay and similar pigments high in alumina or clay are objectionable in primers, because they are absorbents in themselves and do not give up sufficient oil to the wood, consequently the paint scales off.

In the case of hard pine, a very little turpentine may have to be added to the raw linseed oil in order to secure necessary penetration; and in the case of pitch pine, the addition of a small quantity of benzol or solvent naphtha (coal tar naphtha) say 1/32 to 1/16 gallon of benzol to the gallon of mixed paint, is usually sufficient to dissolve the resin or pitch and make the paint adhere to the wood.

Hardwood Primers

Equal parts of raw and boiled linseed oil is the vehicle generally used with primers for hardwood. Boiled linseed oil, reduced with a very little turpentine or benzine, is still considered the preferable vehicle in primers for wagon boxes, hardwood truck bodies, agricultural implements, and similar requirements.

Raw linseed oil with a proper drier also would be all right, but it is a difficult matter for the painter to obtain a suitable oil drier of the proper composition.

The pigment portion of the hardwood primers is essentially the same as that used for soft wood. As a rule, soft wood primers contain less pigment than do hardwood primers.

For Iron and Steel

No penetration of oil or other vehicle takes place on metal due to the non-absorbent surface, consequently to make the primer adhere to the surface, boiled linseed oil or a mixture of oil and varnish, or of oil and a gum japan is necessary, as it is a case of adhesion instead of penetration.

Much has been reported about the rust preventive pigments for iron and steel, and whereas there are a goodly number of them, practical exposure or weathering tests have demonstrated that American vermilion, basic lead chromate, and red lead are the most satisfactory.

Ready-made primers for galvanized iron usually contain considerable varnish or varnish gum, but the best results are obtained by first treating the surface with a solution of copper acetate, because it is a difficult matter to cause paint to adhere to zinc.

For Other Metals

The best primer for new tin is one containing American vermilion, basic lead chromate, or red lead as the pigment portion, ground in boiled linseed oil, and the paste thinned with the following mixture:

6 parts boiled linseed oil,
6 parts implement coach varnish,
1 part japan drier,
3 parts benzine or turpentine.

This thinner will do for all metals; it is only necessary to make up the blended vehicle and then use a sufficient quantity to reduce the paste color to proper consistency for brushing, dipping, or spraying. The varnish referred

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to is the type of modern China wood oil and rosin varnish containing about 45 gallons of wood oil to the hundred pounds of resin, and such character of varnish is known as "long oil" varnish.

New tin is greasy from its method of making, therefore unless this coating is previously removed by washing with benzine or sal soda water, the drying of the primer will be greatly retarded.

Lead and copper surfaces may be coated with the primers described, but if the surface is first roughened with sandpaper nearly any kind of primer should adhere to them.

Zinc surfaces require treatment with copper acetate solution previous to painting. Mr. Henry A. Gardner's formula, recommended, is to dissolve 6 ounces of crystallized copper acetate in one gallon of warm water. This solution should be brushed onto the surface and allowed to dry (evaporate) after which the surface is in good condition to receive the priming coat of paint.

Aluminum may be slightly roughened with No. 0 sandpaper and then primed with any satisfactory primer providing it contains some varnish, but for a lasting job it is advisable to first go over the surface with a solution of caustic potash or concentrated lye, then rinse thoroughly with clear water and allow to dry; after which treatment apply the primer containing varnish. The alkali solution recommended is made by dissolving two pounds of concentrated lye in one gallon of water. Be very careful to avoid getting any solution on the skin or clothing.

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Rosins; Turpentines

Rosins and turpentines are divided into two general classes: those obtained from the crude gum which has exuded from the living tree, and those obtained by various processes from the dead down, lightwood and stumps. The first class is known as gum products: gum turpentine and gum rosin.

The second class is known as wood products: wood turpentine and wood rosin; and depending upon the process employed in their production, the turpentines are again subdivided into destructively distilled wood turpentine and steam-distilled wood turpentine. The former process produces no rosin.—C. F. Speh.

Banquet and Theatre Party

S. Joseph & Son Co., paint and varnish manufacturers, Philadelphia, Pa., tendered an informal banquet and theatre party to the company employes on Wednesday, July 21, 1926, at the Sylvania Hotel.

Mr. Henry S. Haupt, factory superintendent, took charge as toastmaster. Addresses were made by Samuel Joseph, Israel Joseph and Harry Fels, members of the firm, reviewing the progress of the company and paying tribute to the loyalty of the employes.

Each employe was pleasantly surprised with a gift when the party adjourned to attend a theatre. Everybody present agreed that the affair was a great success.

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Why Dyed Colors on Wood Fade

This article contains interesting information and conclusions regarding changes that occur in the color of dyed wood after prolonged exposure to certain kinds of intense light

By George Rice

DYESTUFF colors on wood will fade if poor dyes and chemicals are used, or if these are of good quality and are improperly applied, or if the dyed wood is subjected to a type of light or service which it is not intended for. But what often puzzles even expert dyers and chemists is why certain colors should fade when the quality of the coloring ingredients is up to the standard, the dye bath efficiently conducted and the dyed wood is used for the purpose intended.

This is one of the problems confronting woodworking plants in which wood dyeing and imitating fancy woods is done. And the constantly increasing use of color artistry in the industries is tending to make the situation more intense. Colors are the rage. Some of them are incongruous in their setting, some are metallic in looks, and others are devoid of harmony. But if the color scheme contains a brilliant array of hues and tints, it will be acceptable whether it be for wall paper, textiles, draping or woodwork.

The problem is not so much that of getting a rich field of coloring matter assembled, for the dyestuff manufacturers of this country are now placing in the hands of wood dyers all kinds of dyes, and an almost endless list of coloring ingredients. They could not do this before the war, or for some years after Germany supplied the dyestuffs and chemicals, and controlled the American markets for these goods. But the home product is ample in volume, and efficient now. The problem is, why do the colors fade?

Beyond Control

In a concrete case which I recall, some walnut blocks had been dyed with colors and processes calculated to make the dye fast to artificial light, or the subdued light of an interior. The wood had been carefully surfaced so that nothing had to be done after dyeing except to develop certain parts. The dye had been efficiently fixed and stood up well under the usual tests of damp air, artificial light and the moderate light of a room.

Soon after delivery a complaint was received that the colors were fading. Upon investigation it was found that instead of using the dyed wood as intended, and for which service the colors were guaranteed as fast, the wood had been placed in an artistic design of a show window where the intensity of daylight throughout the day, and the scorching and yellowing effect of direct sunlight during part of the day—this was taking the original luster out of the color, leaving it quite flat and dull.

Ordinarily we would simply say, "The color was faded by the brightness of the light." And so it was. But why should the light fade the color? Ask any dry goods window trimmer why he is careful about placing costly tex-

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For 2-Tone work upon an undercoat.
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Hot weather or cold, wet weather or dry, No. 127 gets goods ready to rub next morning. If you don't rub, pack 'em the next day. They won't print!

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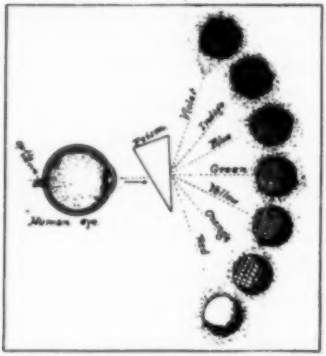
tiles where the bright sunlight will strike, and he will reply: "Because the light will tend to fade the colors." Ask him why light fades colors, and his replies will vary and be elusive.

Causes of Dye Failure

I have consulted with French and German color experts who have stated that light itself does not cause the fading of colors. The reason I was able to consult with these specialists is because I was overseas with the Eighth Division in the war and had a chance to meet these men after the Armistice.



A ray of light can be separated into the seven colors of the spectrum through a prism.

One German authority convinced me in his laboratory that light itself is not directly the cause of color failure as many suppose, but that the light rays set up an intermolecular action in the ingredients which are used to produce the color, causing a loosening of the valencies to the extent of weakening their retaining qualities, and then even fast colors fall off in brilliancy.

The term "valencies" in this connection refers to the affinity properties of the coloring matter, that is, those properties which hold the dye and the dyed material entact. As soon as these properties become affected by light, disintegration sets up and fading results. The light is the primary cause of the color failure, although the actual fading is due to the partial or entire collapse of the molecule which in this case we might call the color molecule.

It will pay anyone who is interested in wood dyeing to decompose a ray of light with a prism in a darkened place. The light ray will contact with the side of the prism and be refracted to a wall or screen beyond in the seven colors of the spectrum, with violet at the top, then indigo, blue, green, yellow, orange, and red at the base.

If all of these colors are painted or dyed on a wooden or card disc, each color covering an equal area, and the disc is whirled around swiftly, the seven separate colors will become neutralized into white light again.

Effects of Different Light

There are different kinds of light to which dyed wood may be subjected when in service. A powerful electrical light can function in a deteriorating manner on colors, although as a rule, not so intensively as normal sunlight. It is the absorption of certain light rays by the coloring substances that affects the luster. These certain rays are established in sun and daylight, and cannot be eliminated for the purpose of protecting colors made by man.

But some of the artificial forms of lights do not possess these color destroying rays, and that is why the colors hold fast in some types of artificial light and not in

"If you could ask manufacturers who use Murphy varnishes and finishes on furniture, pianos, automobiles and other things, if you could talk to architects who specify Murphy finishes, and master painters who use them, you would find that all have a certain confidence in the name Murphy. This confidence is what constitutes the Murphy reputation. Murphy Varnish people are determined, come what will, they will never put out a product that lessens their claim to that reputation."

A NEW Pyroxylin Undercoat For Lacquer

Murphy Kauriol Wood Preparation is a patented pyroxylin undercoat possessing unique qualities which must give it an important place in every wood finishing shop.

It performs the triple function of staining, filling and waterproofing new wood in one application. Since it does not raise the grain sanding is eliminated. Thus in one operation you advance the work of finishing as far as with three operations under ordinary procedure, with a corresponding saving of time, labor and storage space.

Murphy Kauriol Wood Preparation is brushed on like an ordinary filler. In twenty minutes it is wiped off across the grain. That is all. Murphy Kauriol Wood Preparation dries over night and the job is then ready for the finishing coat of varnish, lacquer or wax.

Let us send a man to demonstrate how Murphy Kauriol Wood Preparation will save time and cut finishing costs in your plant.

Murphy
KAURIOL Wood Preparation

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others. All of which makes the situation more complicated. You can take a piece of wood which has been dyed a yellow color, into some hydropathic ward or other place where a violet ray machine is used, and the strong ultra-violet light waves will quickly impart a greenish hue to the yellow article. Then, after the article has been away from the influence of this light for a time, the original yellow will return.

Indigo blue is a staple color, yet it will change color somewhat in sunlight or in a mercury arc light. Then, if placed in a dark room for a time, the original indigo blue will return. Experts who test colors use apparatus as far as possible which possesses the power of developing rays of short-wave length and rays of long-wave length. Tests of the fastness of colors which have to withstand both natural and artificial light are made this way.

Finishing Insulated Cable

The insulated cable used in such tremendous quantities for household wiring, electrical appliances and automobile ignition, to mention only a few of the uses, consists essentially of copper wires coated with a rubber compound and wound around by a cotton braid. Since the rubber compound is not overly proof against water and, more particularly, oil, it is generally protected by a coating of varnish or lacquer.

The varnish is generally a quick-drying but flexible material applied as follows: The cable is drawn from a reel through a bath of the varnish thinned considerably, generally one to one with naphtha. The cable passes under a sheave at the bottom of the tank. It then travels vertically upwards through a drying tower which is from 30 to 60-ft. high and kept at about 200 degrees F.

The speed of travel of the cable is such that it takes ten minutes to reach the upper sheave at the top of the tower and ten minutes to descend again for the second coat. The varnish must dry rapidly enough so that it does not twist off on the upper sheave. Two-four coats are generally given.

In recent months a decided trend toward lacquer finishes, especially for ignition cable, has been noticed. Lacquer, properly plasticized, is exceedingly flexible and far more proof against oil and water than varnish. Moreover it can be dried at a much lower temperature and in one half to one third the time, thus increasing production greatly. The finish given is smoother and more glossy and the selling value is greatly increased thereby.

Two methods are in vogue. One uses a very heavy lacquer through which the cable passes. The excess lacquer is wiped off by running the cable through a hole in hard piano felt held in place by a rigid metal clamp. From 4 to 10 coats are given. The drying temperature is about 100 degrees F., and the time about five minutes. Much trouble, however, is caused by the need of replacing the wipers frequently and by the necessity of watching carefully

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For BRASS

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for knots and splices in the cable, which necessitates cutting the cable and splicing again above the wiper. This raises the labor cost of the operation appreciably.

The most recent advance consists of a lacquer which can be used almost exactly like the varnish. No wipers are used and the advantages of lacquer finish—durability and speed—are retained. Once the proper consistency for the material is determined the operation can be carried on with as little trouble as with varnish.

Since the lacquer is almost colorless, a little yellow dye is added to give the finished cable that richness of color which the user is accustomed to. It seems quite probable that the lacquer-finished cable will supplant the varnished article for all but the cheapest grades.—P. S. Williams.

Lac of India

A publication known as the **East and West Trade Developer**, Rajkot, India, contains an interesting account of the lac industry in Behar. It starts by pointing to the fact that:

"As is well known, lac is a monopoly of India. It does grow in a few adjoining countries but the quality of such lac can not compare with Indian varieties."

Even in India the distribution is very irregular. The main area consists of Chota Nagpur, Orissa and a few districts of Bengal and the United Provinces, which between them produce over 85 percent of the lac.

The annual report of the Forest department of Behar and Orissa for the year 1924-25 tells of the work of propagation of trees and progress toward enlarging the area producing lac.

"One of the most interesting features of the report is that, during the year a scheme for the establishment of plantations of lac bearing trees for the supply of brood lac to the public, was submitted to Government for approval. The Government now proposes to make eight plantations of 750 acres in the most important lac cultivating districts in the Province. It is hoped by this means to help the ryot (peasant) to obtain good brood lac more easily and cheaply than he can now get it, and thus lead to an increased cultivation and an increased supply of raw material to the shellac manufacturers."—J. C. Taylor.

Representatives Report

The Eastern representative, Mr. J. A. Dahlquist, Jamestown, N. Y., and the Western representative, Mr. O. D. Maal, Los Angeles, Calif., of the Industrial Sales Dept. of S. C. Johnson & Son, Racine, Wis., visited at the home office during the last two weeks of June. They reported business conditions much better than generally pictured.

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Issued monthly. Distributed exclusively to executives and foremen finishers in all kinds of industrial plants where finish coats are applied.

AUGUST, 1926

Profitable Professional Career

Readers of INDUSTRIAL FINISHING who are now speculating on what subjects their sons might specialize in when entering college this fall, are reminded of the importance of the chemist in industry today. For example, at the banquet of the Regional Meeting of the American Chemical Society, Madison, Wisc., in May, Mr. W. T. Pearce, in the course of a talk, said:

"The discovery of new oils, methods of making new resins, new pigments, new volatile solvents and many new products, of which nitro-cellulose lacquer is an example, are some of the conquests of chemists. Development of methods of production, methods of control and methods of test are also contributions of chemists and chemical engineers.

"Twenty years ago a chemist in a paint or varnish plant was a curiosity. Now he is in evidence everywhere from the office and large well-equipped research and control laboratories to the various manufacturing units of the plant.

"No industries offer more chemical problems for solution. There is work of many kinds upon pigments for the inorganic chemist, resins, oils, color lakes, solvents and lacquers for the organic chemist, many problems of processes and tests for the chemical engineer, and the whole field for the physical chemist. All made the more interesting, because there is so much of a fundamental nature yet to be discovered, and so many difficulties to be overcome."

Lacquer Speed

It is reported on reliable authority that recently, in a Chicago furniture factory, a dining table and eight chairs were given a complete brown mahogany finish of beauty and durability in the record speed of six hours! The foreman finisher had everything planned and pre-arranged far in advance of the event, so that when the goods in the white entered the finishing department, operations began immediately. It was a special rush job with only one day allowed for the complete finishing process. Some speed indeed, even with modern lacquer.

Perhaps such speed is too fast, but if that finish is really up to quality in appearance, and if it equals or surpasses, in endurance, others which are commonly known as durable finishes for that class of goods, are we justified in insisting that such speed is impossible or impracticable?

Regardless of what opinion we may now hold about this furniture job, it is a recognized fact that automobiles are being given more attractive and more enduring finishes in much shorter time today than was heretofore thought possible, and it is highly probable that the future finishing process on furniture is due for a

much shorter schedule than many finishers now believe possible or practicable.

Smaller Electric Rubbers Needed

From the number of inquiries that come into this office and from what we learn through personal contact with foremen finishers, it is apparent that a strong demand exists for a very small, portable, electric rubber—one which approaches as closely as possible the size, adaptability and convenience of the customary hand rubbing pads.

Portable rubbing machines, some driven electrically and some by compressed air, are already on the market and in service in many finishing rooms. These machines are, for the most part, doing what they are built to do, and where they are given a fair chance the reciprocating type of machines especially, are performing satisfactorily on certain kinds of flat surfaces. However, at best, they can only partially displace hand rubbing.

Their success in performing the work for which they are particularly adapted, has stimulated a desire in the trade for smaller lighter models of greater flexibility—these to supplement rather than displace the present machines, so that even more of the rubbing now being done by hand can be performed mechanically, or if you prefer, electrically.

Paint Exports Increase

Exports of paints and varnishes this year are running considerably ahead of those of 1925, it is indicated by a survey of our international trade in these products.

Statistics compiled by the Department of Commerce show that, for the ten months ended with April, shipments of enamel paints had a total value of $1,043,398 as compared with $433,307 for the corresponding period a year ago. Exports of other ready-mixed paints during the 10-month period totaled 1,866,885 gallons, valued at $3,839,978, as compared with 1,712,746 gallons, valued at $3,576,863 during the same period a year ago while other paints amounted to 9,901,787 pounds, valued at $2,159,087, against 7,831,984 pounds, valued at $1,371,104.

Exports of oil varnishes totaled 580,070 gallons, valued at $1,007,183, during the period ended with April, 1926, against 543,432 gallons, valued at $968,061 a year before, while other varnishes totaled 392,127 gallons, valued at $744,964, against 257,516 gallons, valued at $446,516.

Imports of paint also increased as compared with the same period of the preceding year, the 10-month total being 1,744,365 pounds, valued at $590,564, this year, against 886,638 pounds, valued at $328,643, in the 1925 period. Receipts of varnishes, however, decreased from 24,158 gallons, valued at $54,151, in the 1925 period to 20,897 gallons, valued at $51,627, this year.

Each coat of nitro-cellulose lacquer welds and interlocks with the coat that precedes and follows it, thus establishing a perfect unity of all the applied materials.

The constant development of newer methods and newer materials is a very encouraging indication that we are getting better and better.

Finishing Wood Pails and Tubs

Describing production methods, materials, colors and solutions used in manufacturing low priced pine pails and wooden tubs in a large factory in the New England States

By A. J. Daniels

A CHEAP finish, but a finish that will last as long as the pail itself! This, in effect, is what the executives of the largest pail, tub and ice-cream freezer factory in New England demand. To produce the desired result requires an intimate knowledge of the material from which the utensils are constructed, and more than a fair working knowledge of how paint will act on various woods.

About 90 percent of the pails produced in this country are made of white pine. Tin, galvanized iron and fibre are the materials used to make the other 10 percent. In the factory of Wm. Brown & Sons at Winchendon, Mass., white pine is used exclusively and to insure a supply of this wood the company has for the past 20 years carried on an extensive reforestation project.

Chief Colors Used

There are three standard colors for pails, green, yellow and red. All three colors are called paints but to the experienced painter they would be more likely to be classed as stains. In reality, while they have more body than most commercial stains they are but little more than pigments solved with benzine and given a little body and "stretch" with polish oil and a little (a very little) varnish.

The standard solution used in one factory paint room is five pounds of pigment or powdered color, 25 gallons of benzine and 10 gallons of varnish. Another factory substitutes five gallons of polish oil for five gallons of the varnish with almost equal results.

Plan of Production

The pails come to the finishing room bone dry. They are dried "in the stave"—that is, before being assembled and turned into a pail, the staves are dried for six days in huge dry kilns.

The method used in the Wm. Brown & Sons factory is this: Pails come from the turning room and are piled in one long row along the side of the long paint room. The painter, with his painting frame, works from one end of the pile, taking a pail, painting it and setting it in a new row on the opposite side of the room. As he progresses down the room he leaves a trail of painted pails in what was the vacant side of the room, and a vacant space where the unpainted pails were piled. As the painted pails dry hard in two hours, the production is continuous. The shippers work from the dry end of the pile, having always several tiers of dry pails ahead of them.

The Painting Machine

The painting machine used is in reality an easle with a rotating form. A wooden block, shaped to fit the inside of a pail, is suspended on two arbors above a step-ladder like frame on wheels.

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That you may test this development and fully appreciate its fine working qualities, we will gladly furnish you with a trial quantity of five gallons at bulk prices.

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From the left hand side of the block protrudes a handle like an automobile crank. The block is slightly higher than waist high on an average man.

The painter places a pail on the form, gives it a spin with his left hand and with his right hand dips his brush into the paint pail attached to the front of the machine by a hook. He places his full brush diagonally across the small end of the rotating pail. The effect is like that of a screw being forced into wood. The brush literally climbs toward the big end of the pail, keeping a small wave of paint in front of it until the top is reached.

Surplus paint sprays over the end into the tray of the machine where it is later salvaged. A good worker, after having acquired the trick of making the pail paint itself, can finish 2000 pails a day. Despite the reputed slowness of the brush method, it really sets a mark that a spray gun operator would find hard to equal.

Waterproofing

On the variety of pails known as "kits," which are used to contain salt fish, it is absolutely necessary to waterproof, or rather saltproof, the interior. For years Wm. Brown & Sons used hot paraffine, but lately they have adopted silicate of soda or "water glass." This is applied by the painters. It is brushed on after the outside of the pail has been painted. A machine that clamps the pail and rotates it slowly is used. The soda forms a pore-filling covering that absolutely prevents salt from working through and rusting the hoops of the kits.

Graining

Occasionally an order is received for pails finished with a natural grain effect. This is applied with a tapered graining tool which is affixed to the side of the painting machine in a few minutes. The pails are simply rotated by hand as in regular brush painting, and the rubber graining tool is brought to bear for one complete revolution.

Tub Finishes

Tubs are painted with a better grade of paint. Most of the larger tubs are painted with an oil-base paint which takes longer to dry. The method used is much the same, the paint being brushed on while the tub is rotated. The grained finish has proved popular lately and the factory has found it necessary to install several large graining machines fashioned after the ones used for pail finishing.

Cheap Finish Favored

The cheapest finish ever discovered is much in favor this year for tubs, pails and particularly for ice cream freezers. This finish was introduced to the wood pail business by a former textile dye expert, and so popular has it become that other lines, particularly the toy trade has taken it up.

The new finish is a beautiful mission gray shading off into a dark French gray. The pail makers succeeded in keeping the method of producing this finish a secret for some time but lately it has become common property. Nigrosine is the secret. Nigrosine has never come into its own as a wood stain finish but it bids fair to become a craze in some lines now.

Nigrosine Solutions

A five pound can of blue shade nigrosine dissolved in ten gallons of wood alcohol will keep a pail factory running almost indefinitely. Alcohol and water enough to compensate for loss by evapora-

The Spraco Lacquered

Creates a Market for Itself By the Fineness of its Finish

Appearance does not make a fine piece of furniture, but, from a sales point of view, the lack of it may undo all the good work you have put into it. It is this quality that catches the eye of the buying public, as Tony, the fruit man, will tell you as he polishes up his apples.

When appearance is so important, can you afford not to look into the refinements of the spray method as it has been developed in the 14-A Spraco Gun, through the use of which you can get many times the speed of brush work and above all the result that will sell your product. The finest lacquer and the most skillful workman will not give this final touch that means so much unless the proper tool for applying is used and this you will find in this latest Spraco product. Invest a 2-cent stamp for Bulletin 103.

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tion, are added every day to the big tank in which the mixture is dissolved. The stuff never seems to lose its coloring properties; it does not fade, it is waterproof after it dries and it dries almost immediately. The pail makers brush it on exactly like paint, and the alcohol solvent seems to perfectly restrain the swelling of the grain that usually accompanies the use of a water finish.

Blue shade nigrosine, solved with water, gives a dark, inklike stain. The water seems to deaden and almost kill the delicate blue shade. Solved with alcohol and then reduced with water, the shade is maintained. For this reason alcohol is always used by the pail painter as a primary solvent. A peculiar property of nigrosine is that once it is reduced sufficiently to produce a gray shade on pine, the addition of more water, within reasonable limits, seems to have no effect on the shade.

Thus a five pound can of nigrosine solved with five gallons of alcohol will form a base to which 25 gallons of water can be added. Allowing for evaporation and to replenish the tank after a day's work, a gallon of alcohol and five gallons of water is added. By keeping careful check on the shade and by adding never more than a half pound of nigrosine at a time, the tank can be run indefinitely.

The alcohol after acting as a solvent, serves two purposes. It maintains the nigrosine in solution, preventing the precipitation that accompanies its use with water alone, and it helps a little, to prevent the grain of the wood from raising.

The pails must of necessity be as dry as a super-heated dry kiln can make them. Otherwise they would shrink after hooping and leak. The stain quickly penetrates this dry soft wood and, on pine at least, it is absolutely nonfugitive. I have seen nigrosine stained pails four years old, piled in a well lighted store house and they were just as true to color as the freshly stained articles. The grain of course does raise a little, but soft pine does not seem to be affected enough to be noticeable; and, save on the more expensive pails which are generally finished in varnish, a slight roughness is not considered a defect by the pail makers.

Freezer Barrel Finish

Another gray finish almost equal in cheapness to the nigrosine is used extensively in finishing freezer barrels. This finish is obtained by dissolving a good grade of commercial oil black in benzol and adding benzine. This finish lacks the blue cast of the nigrosine but a deeper shade can be obtained, and for this reason some pail makers prefer it.

Pail painters learn to tell at a glance the condition of the wood in any given lot of pails or tubs, and they mix their paints accordingly. A pitchy lot of pasture pine will cause the paint mixer to add more varnish to his paint. An extra dry lot of staves prompts the adding of more spirits to the stain to prevent raising of the grain. But the principal ingredient of all paint pails is no secret. Witness the reply of an old paint mixer to a query as to how he mixed his colors. "Hugh?" he said, "I mix 'em cheap."

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In the Japanning Room

These recommendations regarding the care and operation of dip tanks screens, strainers, drain boards, hooks, carriers and ovens reveal practical solutions for many problems in the modern japanning room

By T. E. Moorefield

DIRT is one of the "bug-bears" to production in the japanning room where fenders, metal furniture, or other similar work is coated with a baking enamel. Many times an otherwise perfect piece is spoiled by a few small specks of dirt falling onto the work before it is hard and dry. The utmost care is needed to prevent trouble from dirt specks, and while there are a thousand and one ways for dirt to get into the dipping tank or onto the work after it is dipped, careful attention to the following suggestions will help eliminate this trouble.

Separate Operations

Wherever possible, the department should be divided into three parts:

(1) Where rough and dirty work is done, such as sanding, cleaning, bumping, etc.

(2) Where first-coat work is dipped and baked. The sanding or rubbing of this coat may be done in this room or in room No. 1.

(3) Where finishing work (one or more coats) is done. This part of the japanning room must be kept scrupulously clean if good work is expected.

By this arrangement the dirty work is kept away from the clean work and much better results can be secured.

Specks of dirt on the work may be caused by a number of conditions such as excessive trucking, open doors or windows, excessive accumulation of dust or smoke on the oven walls and flues, dirty japan, dirty hooks or dirty metal.

Clean the Hooks

Probably the most general and annoying form of dirt is caused by an accumulation of japan on the hooks used for dipping. The sharp edges of the steel cut this accumulation, allowing the japan to loosen the particles as it flows off. Sometimes this causes a dirty streak all the way down a fender or a sheet of steel. The hooks should be burned off and cleaned (by pickling if necessary) regularly once a week, or whenever there is any appreciable accumulation of japan.

Floors in the japan room should be oiled to keep down the dust. Doors and windows should not be left open so drafts will blow dust or dirt from the walls onto the work. As little trucking as possible should be done while any unbaked work is exposed. Of course, the metal should be clean before it is dipped.

Tanks; Screens; Strainers

Deep, narrow tanks should be used instead of wide, shallow ones, as the deep tanks give any dirt that may have gotten into the japan a chance to settle to the bottom. It is well to have a screen in the tank 6 or 8-in. from the bottom, so that the work cannot touch the bottom and stir up any settlings. Covers should be kept on the tanks when they are not in use.

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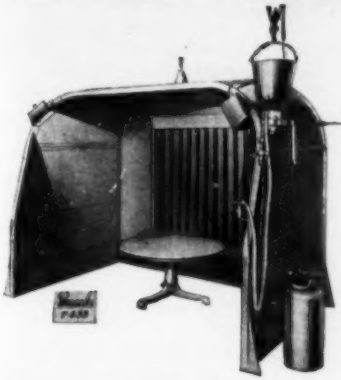

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The dip tank should also have a sub-strainer at one end, that extends down within a foot of the bottom of the tank. This strainer should be covered with a fine-mesh copper screen that will take out small particles when fresh japan or reducer is added to the tank, and also take out similar particles from the japan that has been collected from the drain board and put back into the tank through this sub-strainer.

By having the strainer below the surface of the japan no bubbles are formed when new material is added. If any of these bubbles are present they are likely to appear on the baked product and cause rejection of the pieces.

Clean Tanks

Whenever japan shows any tendency of being dirty the tank should be emptied at once, carefully cleaned by washing with naphtha and the japan strained back into it again. If the work is always clean before it is dipped, if the room is clean, if the tanks are kept covered when not in use, and if all fresh japan or reducer is added to the tank through a strainer, it will not be necessary to clean out the tank very often.

The dip tank should be as near the drain board as possible, not only to save time and labor in getting the work from the drain board to the oven, but also to lessen the chances of stirring up dust while moving the freshly coated articles. Of course, this does not apply so much to conveyor or endless chain ovens, but even here the shorter the distance between the drain board and the ovens the cleaner the work.

Clean the Oven

To keep down the dust in the oven, clean it thoroughly at least once a week. Wipe the walls, the corners, the rods, and all edges with a tack rag made by saturating a cheese cloth with a long-oil coach varnish and wring.ng out the excess. Allow the varnish to dry a short time until it becomes tacky or sticky. It will then pick up all dust and lint.

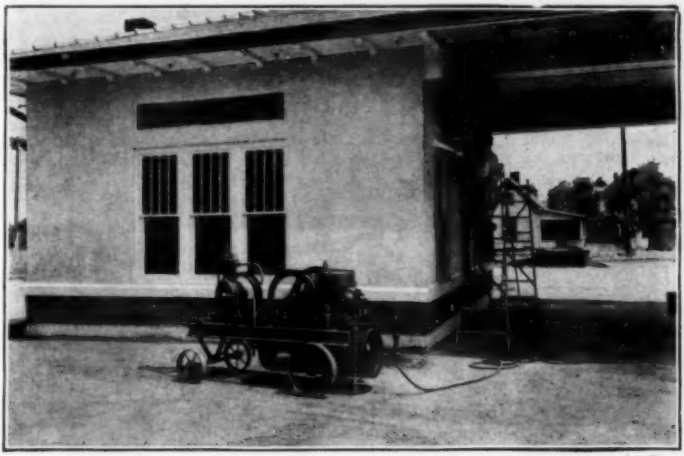
When not in use, the tack rag should be rolled in a wet cloth to prevent it from hardening entirely. A tack rag of this kind is of value also in wiping off the work just before it is coated, in order to insure the removal of all lint and dust.

Behind the heating units in an electric oven, between the false ceiling and the true ceiling of the oven, or in any other part that is not easily accessible to a tack rag, use a vacuum cleaner to suck out the dust and dirt.

Over-baked enamel that has dropped on the floor of the oven should be removed periodically to prevent it from getting onto the work. The stacks should be cleaned out at least once a month if there is any accumulation of soot. It is well also to suspend a flat pan a few inches below the opening of the flue into the oven, to catch any deposits of soot or dust that might be blown into the oven from the flue.

The cleaning of the oven should be done on Saturday morning, if possible. After the oven has been thoroughly cleaned, run one heat with an empty oven so that all remaining particles of dust can find a safe lodging place where they will not be likely to fall on the work.

Never paint the inside of an oven nor spray it with linseed oil. In time, these coatings will bake out hard, become brittle, chip off and fall onto the work. In cleaning a new oven, run the heat up



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to about 250 degrees F. and spray the entire surface, while hot, with water. The steam and water will loosen all the dirt and carry it to the bottom of the oven where it can be picked up with a vacuum cleaner, or carefully swept out.

Avoid Vibration

When hanging work on the rods in an oven, let the weight of the article gradually come to rest on the rod so as to prevent any jarring, which might disturb dust and cause it to settle on the work.

It often happens that an oven door drags on the floor or sticks somewhere else. This causes one to slam it in order to get it shut. As a result the jar causes dust to begin flying and this is likely to eventually settle on the work. By swinging the door rapidly, a draft is created that sucks dirt into the oven and onto the work. Always close the doors slowly and gently.

When through baking an ovenful of work, shut off the heat and let the temperature fall somewhat before opening the door. This allows the surface of the japan to become hard so dust will not stick to it. If the doors are opened too quickly the heat in the oven is likely to suck in dirt that will settle on the sticky work and remain there when it is cold.

Oven Ventilation

Proper ventilation is necessary to produce the best results in the use of japan, as it is to produce and retain good health. When an oven is constantly filled with fumes or smoke the proper luster is not obtained on the finished work. It is apt to have a cloudy or smoky appearance and doubly apt to be covered with little specks of dirt. In addition there is greater danger from explosion and fire in many cases under these conditions.

If the work is crowded in an improperly ventilated oven, some of it is sure to come out underbaked, particularly in spots. Generally, the work hung near the walls will be baked out nicely and the work in the center of the oven will be soft.

Under poor ventilating conditions the fumes are sometimes so heavy that the finish is wiped entirely off the edges of the work. The japan must have air to bake out properly. Troubles caused by lack of proper ventilation can be overcome to some extent by hanging the articles farther apart and also by running the heat up very slowly.

Light To Suit Job

Every varnish rubber appreciates good light, whether he is rubbing by hand, or with a machine. It is not always possible to have the rubbing table as favorably located as is the one shown in the accompanying picture, where light comes in from two sides; but where this is not possible, there are other ways in which present lighting could be greatly improved.

As a rule the modern plant is so constructed that it is well supplied with natural light when that is available, but when artificial light must be employed the electric lighting conditions are sometimes unsatisfactory. Lighting engineers do not always give proper consideration to the use to which a room is to be put. Too often they plan for a uniform distribution of light, instead of having it concentrated on certain points.

As an illustration, take the man in the accompanying picture.

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What does he care how much or how little light there may be ten feet away from the piece he is rubbing, so long as there is plenty of light just where he most needs it? Give him plenty of light without shadows on his work, and there will be plenty of light near him for all practical purposes.

Rubbing flat tops with portable air-driven rubbing machine.

Lighting a factory is different from lighting a store, a church or theatre, where it is necessary to have uniform distribution. In most factories it is necessary to supplement the general lighting with individual lights so arranged that they can be focused on certain points at the will of the workmen. Men cannot do their best when working in their own or some other shadow.

When planning the location of lights for any open space, it is easy to do it on paper if an even distribution is desired, but when planning a lighting system for a factory in which men must work, and in which there will be many obstructions, it becomes necessary to know something of the nature of the work to be done in order to plan intelligently.

Sometime ago I was in a factory which is supposed to be modern in every respect. The lighting system was planned for uniform distribution on every floor, notwithstanding that the work on each floor is entirely different from the others. Planning the factory lighting system should be done with a view to meeting individual requirements. This can be done only after consulting every available source of information.

The most careful study of requirements should precede the final draft of plans for lighting a factory. In many factories it is necessary to have a system which permits moving many of the lights. Sometimes this is done with an adjustable extension cord. An excellent plan for some conditions includes the use of an extension arm attached to the ceiling—an arm which not only can be extended, but which can also be shifted vertically and horizontally to meet any requirement.—L. N. Tempton.

Hilo Varnish Erects New Building

The Hilo Varnish Corporation, of Brooklyn, N. Y., has under construction a five-story building 75 x100 ft. on an adjoining corner. The building will have an interior court 40x45 ft. It is to be built entirely of reinforced concrete and built for a floor load of 300 pounds per square foot, so built that later additional stories can be added.

The first floor will be entirely a shipping floor, with facilities for loading two trucks inside of the building, off the street, and two additional trucks just outside the building, on the street.

The second floor will be used entirely for storage, and the three upper stories for the grinding department, thereby doubling the grinding space now available. As soon as these added facilities are in service the company expects to bring out a new and important lacquer finish.

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Questions and Answers

This service department is conducted to meet the readers' need for prompt information on specific problems, and to give others an opportunity to review the questions and to offer comments, suggestions or answers

Lacquered Refrigerators

The firm I work for manufactures electric refrigerators. These boxes are all steel and are finished in white lacquer. We have had trouble with our doors and panels not having the same cast as the box, although they receive the same treatment. They generally have more of a bluish cast than the boxes. The method we are using consists of:

One coat of oil primer sprayed on.
Two coats of lacquer surfacer sprayed on.
Five coats of lacquer enamel sprayed on.

If you can give me any information that will help to overcome same I will surely appreciate it.—A. B.

Reclaiming Shellac

We have just heard of a method of reclaiming shellac. It appears it is possible to catch it in some sort of silk and dilute it again in alcohol. Our waste shellac drys into white particles around our spray booth. It appears from the conversation with our foreman that we have about one-third waste. We should like to find out more about this subject if you can suggest anything.—C. W. P. Co.

Regarding shellac, the cutting is a very simple operation—merely dissolving the gum in alcohol by continued agitation. The better grades are clarified by putting through a clarifying machine somewhat like a cream separator. Shellac should be cut in minimum time, clarified, then stored in air-tight wood containers to avoid evaporation of alcohol and consequent thickening. It would not pay you to make small quantities, and considering the extremely low price obtaining for quite some time, it surely would not be worth while to attempt to recover the by-product from your spray booths.—I. F.

Gray Iron Castings—Lacquer Finish

We are making a product, using gray iron castings which are tumbled and sand-blasted or pickled. Can you tell us the best method of filling, priming and application of brushing lacquer? We are using a light gray lacquer and want to get a very smooth, highly polished surface.

The best results obtained by us so far comes from using a regular iron filler brushed on, sanded, then a coat of automobile body undercoat, sanded, and then the lacquer. We would like to get some material that would cover properly with one coat, which could be sanded and be ready for the lacquer. Any information you can give us will be appreciated.—T. M. & M. M. Co.

It is not easy at all to diagnose the trouble and prescribe a remedy at so great a distance unless one is famliar with the nature of the work to be finished, the conditions in the finishing room, the

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exact type of finish wanted and all such details which have a considerable bearing upon the result secured with any finishing materials.

Since the gray iron castings are tumbled and sand-blasted or pickled, we presume they are fairly smooth and do not have any deep blow holes to be filled.

The system of using iron filler on automobile undercoats, each of which is sanded, can be simplified by choosing an iron filler which will withstand the solvent action of lacquer reducers and still have good filling and sanding properties, so that the iron filler can be used for both coats; or possibly only one coat would need to be used, provided the rougher portions of the work are smoothed up by applying iron filler with a knife before the regular coat is brushed on.

Probably a little better result could be secured by using a good grade of automobile body sanding surfacer applied directly next to the metal and sanded smooth. There are also on the market a sanding surfacer and putties made on a nitro-cellulose lacquer basis which would give quicker drying time but which would not fill quite as well in one coat as oil surfacing material.

We are inclined to feel that perhaps the greatest improvement in your finish would be made by applying the lacquer by spraying instead of by brushing, provided you are now getting a very smooth surface under the lacquer when you sand your foundation coats. There is also some difference in the flowing and leveling out qualities in the various makes of brushing lacquers, and it might pay you to get in touch with other lacquer manufacturers and test out their brushing products in case it is inadvisable for you to apply lacquer by spraying.

Decorated Furniture Colors

In the May and June issues, you had a two-part article regarding colored furniture. We are extensive manufacturers of decorated colored furniture. We should like to obtain some information as to how to mix our paints. We now buy our colors at anywhere from $2.00 to $2.25 a gallon. Is it possible for us to save anything by mixing our own colors?

In this particular line of business the color must not be exactly alike every time a batch is mixed, and if there is a saving by mixing it ourselves, we should like to do so. We now use a flat black paint, a Chinese red flat paint and a jade green flat paint.—P. C. & N. W.

Unless you are a consumer of a very large amount of finishing materials it is altogether inadvisable to attempt the making of your own supplies, requiring, as it does, special equipment and the employment of a practical man or men. This does not apply of course, to the making of such materials as stains, which almost invariably are mixed by the foreman finisher in practically all large furniture shops; but our reference is to cutting shellacs, and the grinding and mixing of paints and enamels for usage as in your particular case.

Paint making requires an intimate understanding of the composition and properties of the pigment and vehicle raw materials, and a knowledge of compounding from practical experience. The smaller batches of the different

kinds of paints, as against regular plant production of standard goods, would make yours very expensive in cost because all operations would apply against less gallonage and consequently higher in cost per gallon output; and further, production losses and wastage increase very materially as quantity is reduced.

It is perfectly proper for you to do shop tinting to make the various shades of finishes required by your trade, but for that, you would procure the desired grade of flat, eggshell and gloss goods in white ready for use, for using as white and light tints, and for such others as jade green specifically mentioned. Chinese or mandarin red is almost devoid of white and therefore would necessitate your carrying two color bases—chrome orange and deep para red.

For a color varnish or enamel, it would require about two pounds of chrome orange ground in varnish to soft paste consistency, added to a half-gallon of standard shade of red enamel. The extra paste should be offset by adding about a half-pint of mixing varnish, the whole resulting in about ⅝ gallon of Mandarin red color varnish with very good tone.

Or you could make it up complete by using the orange and red colors in japan with a reliable brand of mixing varnish. You would obviate possible difficulty in this procedure by following the manufacturer's recommendation of varnish in which the japan colors would be perfectly miscible without curdling.

A dead flat ground could be produced by the same combination of colors reduced in turpentine instead of varnish; likewise

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using ivory drop black in japan and thinning with turpentine for flat black, etc. All such flat coloring of your furniture must then be subsequently finished with clear varnish, and rubbed if desired or resorting to the cheaper method of flowing on a coat of high-grade dull-finish varnish to simulate hand rubbing.—I. F.

More About "Automobile Refinishing"

Fair criticism of what one writes is usually valuable and, so far as I am concerned, is always welcome; but before anyone assumes the role of critic he should familiarize himself with the whole contents of the article he attempts to criticise.

In June number of this journal, page 54, Mr. E. Perry challenges some recommendations which I made in an article used in the May issue (page 9) and says it is fair to assume that I am a lead-and-oil painter. It might interest Mr. Perry to know that I was for five years connected with the finishing department of one of the largest automobile plants in the U. S., and that I helped to perfect a finish which is admitted to be the most durable automobile finish ever used on cars, prior to the advent of lacquer—and I am not sure that it is not better than that in many respects.

The main error in Mr. Perry's criticism is caused by the fact that it is based on isolated passages of my article instead of the article as a whole, and that his system and the materials which he recommends antedate the forced drying or baking of finishes. His whole series of criticisms ignores what I said about baking the foundation coats as a

means of hardening the slow-drying materials.

Before the days of forced drying, varnish was used in lead glazing because it dried faster than oil, but oil is more durable than varnish, and for that reason is preferable where baking is employed. Varnish may be used with the oil to hasten drying (as all varnishes contain oil) but a small quantity of japan drier is better in my opinion. Mr. Perry may think differently—that is his privilege.

The same may be said regarding his criticism of what I said about roughstuff. He would substitute varnish as a drier in place of japan. I would use japan because I could then use more oil which, as I said before, is more durable than varnish. One may, or may not use lead in roughstuff—all depending on how much of it is to be left on the surface. My system is to leave as little roughstuff on as possible. Some finishers used half-and-half, that is, half roughstuff and half lead paint, or equal parts of each mixed together.

There was a time when only japan colors were used for the ground coat, but that again was before forced drying was in vogue. Today, some finishers are using, as Mr. Perry says, a sealer-coat in which varnish is an important part—a light-body varnish which contains considerable oil. I prefer oil and a small quantity of drier because I believe it to be more durable.

I still contend that varnish does not form a perfect union with a hard surface, even though that surface be a varnish one. Almost every varnish rubber knows this. When each coat of varnish is allowed to dry hard before the

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succeeding coat is applied, each coat will show when it is rubbed through to the coat below, on the high spots. Varnish will crawl on oil-vehicle coatings only when the latter are not thoroughly dry.

By ignoring the fact that my system as outlined in my article lays stress on the necessity of baking the foundation coatings, Mr. Perry has been able to convince himself that I am inconsistent when I insist "that the foundation for lacquer must be hard to withstand the lacquer," when up to this point all my recommended materials for undercoating the work have been oil goods.

Mr. Perry even objects to my suggestion that "Although it is very smooth, the sprayed lacquer surface is seldom a perfect finish, and it can be improved if each coat is given a slight rub with fine sandpaper before the succeeding coat is applied." I said a "slight" rub with fine sandpaper—not a rub that will wear away part of the film—just enough to knock off any nibs which may be present.

* * *

In July issue of this journal (page 50) Mr. A. F. Eibell gets after my article in a manner which is almost, if not quite, as forceful and dogmatic as did our friend Perry, page 54, June. After reading Mr. Eibell's criticism I looked up my article to see what heading had been given it; then I looked up the copy of my manuscript to see what heading I had given it, and in doing so I made this discovery—or rediscovery, because I first discovered it when the May journal came to me—that the heading on the original manuscript was, "Quality Finish on Automobiles," and this had

been changed to "Automobile Refinishing."

I cannot believe that if Mr. Eibell had known that the method outlined in my article was intended for a finish of the very highest quality, for cars of the more expensive type, he would have come out with a substitute formula by which cars are to be delivered on the sixth day after entering the shop—at least I would not like to think that of a man who claims to be an instructor of youth in the art of automobile finishing.

What I have said in reply to Mr. Perry will answer also a good deal of Mr. Eibell's criticism. In looking over some notes which I had jotted down in anticipation of the time when I would write an article on "Refinishing the Cheaper Car," and comparing them with Mr. Eibell's article I find that in many things we are agreed, as his method is quite suitable for the cheaper touring car whose owner cannot afford a finish of the better quality—or rather thinks he cannot do so.

Everyone who knows anything worth while about finishing materials knows that, apart from the ingredients used in lacquer, pure linseed oil is the most durable ingredient used in finishing materials. It is one of the principal ingredients of varnish, and no matter what kind of gum is used in the varnish, the durability of the varnish in exposed situations is lengthened or shortened by the quantity of oil used. It is well known that a varnish that is "long" in oil is more durable than is one in which the oil is "short."

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more durable when hardened by a forced-drying process, and are more impervious to moisture; also that these slow-drying materials are more durable than are those which naturally dry in a short time.

Referring to Mr. Eibell's "Modern Materials Available," he might have divided these into two classes, (1) materials for high-class work, and (2) materials for a quick, cheap job. I have used both materials and know what they are.

The materials which I recommended, if applied in the way suggested, will produce a finish which will last until the final coats of lacquer have been worn away in the process of repolishing. Barring accidents to the finish, there never will be any need for refinishing from the bottom up; and when it becomes necessary to replenish the outer finish, or coats of lacquer, it will be necessary only to apply one or more coats of lacquer, and rub, to make the job look like new.

There is one thing suggested in Mr. Eibell's article with which I am wholly in accord, and that is the average automobile finisher should "stop shop-mixing." There are some finishers quite qualified to do their own mixing—but very few. The great majority of finishers will both receive and give better satisfaction if they buy their materials in such a condition that they are as near as possible ready for applying.

I observe from the notes by the editor that Mr. Eibell is located outside the north temperate zone, hence knows nothing about the extremes of heat and cold to which automobiles are exposed in the state of Michigan and Canada. To those who are refinishing cars

in localities where these extremes are met with I would suggest, if they have any doubt about the comparative values of Mr. Eibell's method and mine, that they finish a piece of metal by each method, and place test pieces where they will get the full glare of the summer's sun, and the full force of the winter's cold—or subject them to any other test.—R. J. Birnel.

Never use paper adhesive tape, such as is used for securing packages, nor electrical insulating tape, to hold paper masks on a newly lacquered surface; both of these tapes pull and discolor the lacquer.

Spraying outfits are now well developed to give satisfactory service, and spray equipment manufacturers are prepared to give valuable information on the selection and installation of this apparatus.

An authority on the subject states that lacquer production and consumption are about doubling each year.

This pair of portable trestles are used in the finishing room of a large show case factory to support large work which must be moved into and out of the big spray booth. The walnut-faced cornice and complete top section of a portion of dry goods wall shelving is shown resting on the trestles.

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